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Openness to Using Non-cigarette Tobacco Products Among U.S. Young Adults

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Abstract

Introduction—National data indicate that the prevalence of non-cigarette tobacco product use is highest among young adults; however, little is known about their openness to use these products in the future and associated risk factors. This study sought to characterize openness to using non-cigarette tobacco products and associated factors among U.S. young adults.

Methods—In 2014, National Adult Tobacco Survey data (2012–2013) were analyzed to characterize openness to using the following tobacco products among all young adults aged 18–29 years (N=5,985): cigars; electronic cigarettes ("e-cigarettes"); hookah; pipe tobacco; chew, snuff, or dip; snus; and dissolvables. Among those who were not current users of each product, multivariable logistic regression was used to examine associations between demographics, cigarette smoking status, lifetime use of other non-cigarette products, perceived harm and addictiveness of smoking, and receipt of tobacco industry promotions and openness to using each product.

Results—Among all young adults, openness to using non-cigarette tobacco products was greatest for hookah (28.2%); e-cigarettes (25.5%); and cigars (19.1%). In multivariable analyses, which included non-current users of each product, non-current ever, current, and former smokers were more likely than never smokers to be open to using most examined products, as were men and adults aged 18–24 years. Receipt of tobacco industry promotions was associated with openness to using e-cigarettes; chew, snuff, or dip; and snus.

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Appendix

Supplementary data

Supplementary data associated with this article can be found at, http://dx.doi.org/10.1016/j.amepre.2015.08.015.

Conclusions—There is substantial openness to trying non-cigarette tobacco products among U.S. young adults. Young adults are an important population to consider for interventions targeting non-cigarette tobacco product use.

Introduction

Non-cigarette tobacco product use is increasing in the U.S., particularly among young adults.[1–7] Nationally, 18.2% of young adults use hookah; 8.9% use cigars; 8.3% use electronic cigarettes (e-cigarettes); and 4.4% use smokeless tobacco.

Similar to susceptibility, openness to using tobacco has been characterized as a step in the progression to regular tobacco use,[8] and e-cigarette use has been associated with openness to cigarette smoking among young adults[9]. Compared with older adults, young adults may be more open to trying non-cigarette tobacco products because marketing specifically targets them[5,10,11]; owing to product features, such as flavorings, novel technology (e.g., e-cigarettes), and attractive packaging[12–14]; and a lower perception of risk and addiction compared with cigarettes.[5,6,11,15–17]

To date, young adults' openness to using non-cigarette products has not been systematically investigated. This study sought to fill this research gap by examining openness to using non-cigarette tobacco products and associated demographic characteristics and tobacco use risk factors among U.S. young adults aged 18–29 years using 2012–2013 National Adult Tobacco Survey (NATS) data.

Methods

Study Sample

A complete description of 2012–2013 NATS methodology is available elsewhere.[1,18] Between October 1, 2012, and July 30, 2013, a total of 60,192 interviews were conducted (44.9% overall response rate)[1] including 5,985 young adults aged 18–29 years. CDC's Human Research Protection Office approved the NATS protocol.[18]

Measures

Items assessed demographic characteristics (age, gender, race/ethnicity, education, and marital status); receipt of any past-month tobacco industry promotions; and perceived harm and addictiveness of cigarette smoking.[18]

Current cigarette smoking and current use of non-cigarette products were operationalized using existing definitions from national surveys,[1,19–21] described in the Appendix (available online). Current non-cigarette product users were described in the sample but excluded from analyses of openness to using that product. Among non-current users, a binary variable indicating lifetime use of any other non-cigarette product was used as a covariate.

A binary dependent variable was created to indicate respondents' openness to using cigar products (cigars, cigarillos, little filtered cigars); e-cigarettes; hookah; pipe tobacco; chew, snuff, or dip; snus; and dissolvable tobacco. Based on prior research,[9] openness was

operationalized using a combination of items assessing product awareness (for e-cigarettes, snus, and dissolvables); use; and likelihood of product use in the next year, described in the Appendix. Respondents not open to using the product were not aware of the product or indicated they definitely will not use it. Respondents open to using the product had tried it previously or indicated any response, other than definitely will not use it in the future.

Statistical Analysis

Analyses were conducted in 2014, with survey data procedures in SAS, version 9.3, using sample strata and weights to account for complex sample design and non-response. Openness to using non-cigarette tobacco products was examined descriptively, and bivariate associations with openness to using non-cigarette products were examined with chi-square and *t* tests. Multivariable logistic regression was used to examine independent associations between all predictors and openness to using each non-cigarette product. A small number of respondents indicated openness to using dissolvables (1.5%) and produced unstable estimates, so dissolvables were excluded from bivariate and multivariable analyses. Sensitivity analyses, described in the Appendix, were conducted to confirm that different definitions of openness did not affect reported findings.

Results

Sample characteristics are shown in Table 1, and openness to using each product is shown in Table 2. Results of bivariate analyses of associations with openness to using each product are presented in the Appendix. For the multivariable results (Table 3), the odds of being open to using each non-cigarette tobacco product, except hookah, were significantly higher among men; odds were significantly higher for young adults aged 18–24 years for all products except chew, snuff, or dip. Minority racial/ethnic respondents were significantly less likely to report openness to using e-cigarettes; chew, snuff, or dip; and snus.

Current smokers were significantly more likely to report openness to using each non-cigarette product, and openness to using each product, except pipe tobacco, was significantly higher among non-current ever and former smokers (Table 3). Lifetime use of any non-cigarette product, other than the product in the model, was consistently associated with openness. Receipt of tobacco industry promotions was associated with significantly higher odds of openness to using e-cigarettes; chew, snuff, or dip; and snus. Those who perceived that cigarettes are harmful were less likely to be open to using cigar products.

Discussion

Young adults are open to using hookah, e-cigarettes, and cigar products, and a smaller albeit substantial proportion is open to using pipe tobacco; snus; and chew, snuff, or dip. There were consistent associations between openness to using non-cigarette products and gender and age, strong associations with cigarette smoking, and weaker but significant associations with receipt of tobacco industry promotions.

Findings suggest that incorporating non-cigarette products in proven tobacco control measures, including tobacco-free policies, cessation interventions, and public education

campaigns, could help to reduce young adult's overall tobacco use.[22] Targeted interventions for high-risk subgroups may also be warranted. For example, current cigarette smokers were more likely than never smokers to indicate openness to using non-cigarette products, highlighting the importance of ensuring young adult awareness of evidence-based cessation interventions[22,23] and interventions targeting concurrent use of multiple tobacco products.

Although prior research demonstrates that youth's openness to using tobacco is a step in the progression to regular use,[8] it is unclear how many young adults who are open to using non-cigarette products will do so. Research investigating prospective patterns and predictors of young adult non-cigarette tobacco initiation, including whether those open to using non-cigarette tobacco actually use these products in the future, would further validate openness as a risk factor, and can also further inform public health interventions.[24] Findings relative to specific demographic groups also have implications for future research. The increased odds of openness to using non-cigarette products among non-Hispanic whites, and associations between higher educational attainment and openness to using hookah, appear unique to these products. These results differ from studies where young adults' concurrent use of multiple non-cigarette products was analyzed as a single variable,[25,26] underscoring the importance of product-specific analyses in future research.

Limitations

This study has notable limitations. It focused on young adults because this group is at risk of tobacco use, but these findings may not generalize to other populations. Although NATS uses well-validated measures, definitions of openness and use behaviors varied across products owing to the survey questions, which may affect findings. Additional research would be useful to continue establishing the validity of openness measures, including if openness predicts future tobacco use in young adults. Measures of perceived harm and addictiveness were limited to cigarette smoking, and tobacco industry promotion measures did not specifically capture receipt of promotions for non-cigarette products. Future studies should incorporate measures that allow for consistent definitions across products and examine how product-specific perceptions and industry promotions relate to openness to using non-cigarette products among young adults.

Conclusions

Despite these limitations, this study advances research on young adult non-cigarette tobacco product use by providing estimates of openness to using these products and associated factors. Findings highlight the importance of young adulthood as an opportunity for tobacco use prevention. Product-specific and demographically focused public health interventions targeting young adults could be leveraged to prevent and discourage tobacco product use among young adults.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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Table 1

Characteristics of Young Adults Aged 18 to 29 Years (n=5,985), National Adult Tobacco Survey 2012–2013

Demographics	***n* (%) or M (SE)**
Gender	
Male	3,071 (51.5)
Female	2,913 (48.5)
Race/ethnicity	
Non-Hispanic white	3,618 (55.9)
Non-Hispanic black	483 (10.7)
Hispanic	989 (20.5)
Other group or unknown	895 (12.8)
Age, M (SE), years	23.3 (0.05)
18–24	60.4 (3,236)
25–29	39.6 (2,749)
Education	
<High school	453 (12.5)
High school diploma or equivalent	1,671 (34.1)
Some college	1,975 (34.4)
≥College degree	1,886 (18.9)
Marital status	
Married/partnership	2,187 (30.5)
Unmarried	3,798 (69.5)
Annual household income ($)	
<30,000	1,123 (19.5)
30,000–49,999	1,396 (22.8)
50,000–69,999	877 (14.2)
70,000–99,999	822 (12.5)
≥100,000	794 (12.5)
Refused, don’t know, missing	973 (18.5)
Cigarette smoking status	
Never smoker	2,327 (39.9)
Non-current ever smoker	1,766 (28.4)
Current smoker	1,282 (22.8)
Former smoker	608 (8.9)
Received any industry promotions, past month	1,385 (23.5)
Perceived harm of cigarettes, M (SE)	
Cigarettes are addictive (range 1–3)	2.6 (0.01)
Cigarettes are harmful (range 1–3)	2.9 (0.01)

Note: Weighted % of sample (raw *n*) are displayed unless otherwise indicated.

Table 2

Current Use and Non-Users' Openness to Using Non-Cigarette Tobacco Products, National Adult Tobacco Survey 2012–2013

	Raw *n* (weighted column %)						
	Cigar products	**Electronic cigarettes**	**Hookah**	**Pipe tobacco**	**Chew, snuff, dip**	**Snus**	**Dissolvables**
Not open to using							
Not aware	—	646 (12.1)	—	—	—	3,412 (59.7)	5,429 (90.4)
Definitely will not use	3,878 (65.0)	3,407 (54.8)	3,378 (57.8)	5,037 (84.0)	5,103 (91.3)	1,717 (26.9)	465 (8.0)
Open to using	1,132 (19.1)	1,499 (25.5)	1,733 (28.2)	730 (12.7)	499 (8.3)	716 (11.1)	83 (1.5)
Probably will not use	668 (11.2)	373 (6.6)	343 (5.8)	593 (10.4)	167 (3.3)	95 (1.8)	48 (0.9)
Probably will use	149 (2.5)	78 (1.4)	72 (1.2)	59 (1.0)	8 (0.2)	7 (0.2)	2 (0.02)
Definitely will use	23 (0.4)	11 (0.2)	4 (0.1)	6 (0.1)	1 (0.02)	2 (0.03)	4 (0.06)
Trier, non-current user	292 (5.0)	1,037 (17.3)	1,314 (21.1)	72 (1.2)	323 (4.8)	612 (9.1)	29 (0.5)
Current user	975 (16.0)	433 (7.5)	874 (14.0)	218 (3.3)	383 (5.9)	140 (2.2)	8 (0.1)

Note: Cigar products include cigars, cigarillos, and little filtered cigars. Measures and definitions of openness to use non-cigarette products are detailed in the Appendix (available online).

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Table 3

Logistic Regression Analysis of Openness to Use Non-Cigarette Tobacco Products, National Adult Tobacco Survey 2012–2013

Demographics	Cigar products (*n*=5,010)	Electronic cigarettes (*n*=5,552)	Hookah (*n*=5,107)	Pipe tobacco (*n*=5,767)	Chew, snuff, dip (*n*=5,602)	Snus (*n*=5,845)
Gender						
Male	**3.16 (2.59, 3.86)** ***	**1.37 (1.13, 1.67)** **	1.17 (0.99, 1.38)	**2.86 (2.28, 3.61)** ***	**5.55 (3.98, 7.76)** ***	**4.85 (3.66, 6.43)** ***
Female	ref	ref	ref	ref	ref	ref
Race/ethnicity						
Non-Hispanic white	ref	ref	ref	ref	ref	ref
Non-Hispanic black	0.87 (0.59, 1.28)	**0.57 (0.39, 0.83)** *	1.07 (0.78, 1.45)	0.71 (0.46, 1.08)	**0.47 (0.25, 0.88)** *	**0.17 (0.08, 0.34)** ***
Hispanic	1.01 (0.79, 1.31)	**0.72 (0.55, 0.94)** *	1.23 (0.99, 1.54)	1.28 (0.98, 1.67)	**0.68 (0.48, 0.96)** *	**0.39 (0.28, 0.56)** *
Other group or unknown	0.80 (0.59, 1.09)	1.02 (0.76, 1.37)	1.08 (0.85, 1.39)	1.06 (0.77, 1.45)	0.97 (0.67, 1.39)	**0.66 (0.47, 0.93)** *
Age, years						
18–24	**1.51 (1.22, 1.86)** ***	**1.67 (1.36, 2.05)** ***	**1.58 (1.33, 1.87)** ***	**1.68 (1.33, 2.13)** ***	1.17 (0.90, 1.54)	**1.38 (1.09, 1.76)** **
25–29	ref	ref	ref	ref	ref	ref
Education						
<High school	ref	ref	ref	ref	ref	ref
High school diploma or equivalent	1.21 (0.81, 1.80)	1.12 (0.76, 1.65)	**2.08 (1.46, 2.97)** ***	0.80 (0.54, 1.17)	0.92 (0.59, 1.45)	1.12 (0.72, 1.76)
Some college	1.29 (0.86, 1.94)	1.12 (0.77, 1.64)	**2.71 (1.91, 3.85)** ***	0.86 (0.59, 1.27)	0.72 (0.46, 1.14)	0.96 (0.61, 1.50)
≥College degree	1.35 (0.88, 2.06)	0.96 (0.64, 1.43)	**4.22 (2.93, 6.08)** ***	0.87 (0.58, 1.31)	0.72 (0.45, 1.17)	0.78 (0.48, 1.25)
Marital status						
Married/partnership	0.97 (0.78, 1.20)	1.00 (0.83, 1.22)	**0.71 (0.60, 0.84)** ***	**0.75 (0.59, 0.96)** *	1.25 (0.95, 1.65)	0.87 (0.68, 1.10)
Unmarried	ref	ref	ref	ref	ref	ref
Household income ($)						
Refused, don't know, missing	0.80 (0.54, 1.18)	**1.55 (1.07, 2.32)** *	**0.53 (0.39, 0.73)***	0.76 (0.52, 1.11)	1.26 (0.80, 2.00)	0.93 (0.60, 1.43)
<30,000	0.77 (0.54, 1.09)	1.07 (0.76, 1.51)	**0.53 (0.40, 0.71)** *	0.75 (0.53, 1.07)	0.98 (0.63, 1.53)	1.20 (0.79, 1.81)
30,000–49,999	0.78 (0.55, 1.10)	1.29 (0.93, 1.80)	**0.60 (0.46, 0.80)** *	0.80 (0.57, 1.12)	0.93 (0.61, 1.43)	0.79 (0.54, 1.15)

Demographics	Cigar products (*n*=5,010)	Electronic cigarettes (*n*=5,552)	Hookah (*n*=5,107)	Pipe tobacco (*n*=5,767)	Chew, snuff, dip (*n*=5,602)	Snus (*n*=5,845)
50,000–69,999	0.90 (0.62, 1.31)	**1.51 (1.04, 2.19)***	**0.66 (0.48, 0.90)***	1.03 (0.71, 1.50)	1.18 (0.75, 1.87)	0.94 (0.61, 1.45)
70,000–99,999	0.84 (0.57, 1.23)	1.32 (0.92, 1.90)	0.75 (0.55, 1.01)	0.97 (0.67, 1.40)	1.20 (0.75, 1.90)	1.18 (0.76, 1.82)
≥100,000	ref	ref	ref	ref	ref	ref
Cigarette smoking status						
Never smoker	ref	ref	ref	ref	ref	ref
Non-current, ever smoker	**2.20 (1.62, 2.97)*****	**3.15 (2.41, 4.11)*****	**4.07 (3.31, 5.05)*****	0.95 (0.68, 1.34)	**1.56 (1.01, 2.42)*****	**2.11 (1.34, 3.34)*****
Current smoker	**6.85 (4.87, 9.63)*****	**29.93 (21.51, 41.64)*****	**3.78 (2.84, 5.05)****	**2.39 (1.64, 3.48)*****	**4.01 (2.48, 6.49)*****	**8.27 (5.05, 13.56)*****
Former smoker	**5.91 (4.18, 8.36)*****	**8.80 (6.37, 12.17)*****	**4.44 (3.30, 5.98)*****	1.31 (0.88, 1.96)	**4.87 (3.03, 7.82)*****	**6.66 (4.05, 10.95)*****
Use of any other non-cigarette product						
Yes	**2.36 (1.85, 3.02)*****	**1.94 (1.57, 2.39)*****	**2.08 (1.70, 2.54)*****	**2.89 (2.12, 3.94)*****	**1.64 (1.14, 2.34)****	**3.79 (2.52, 5.69)*****
No	ref	ref	ref	ref	ref	ref
Industry promotions						
Received any promotion	1.23 (0.97, 1.54)	**1.87 (1.51, 2.35)*****	1.13 (0.92, 1.39)	1.06 (0.82, 1.37)	**1.39 (1.03, 1.89)***	**1.64 (1.27, 2.10)*****
No promotions	ref	ref	ref	ref	ref	ref
Perceived harms						
Cigarettes are addictive	0.98 (0.83, 1.15)	1.01 (0.86, 1.17)	1.14 (0.99, 1.31)	0.85 (0.71, 1.01)	1.06 (0.86, 1.30)	1.14 (0.93, 1.40)
Cigarettes are harmful	**0.66 (0.50, 0.88)****	0.84 (0.63, 1.13)	0.95 (0.73, 1.24)	0.80 (0.62, 1.04)	0.83 (0.58, 1.18)	1.13 (0.82, 1.54)

Note: Boldface indicates statistical significance (*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$). All independent variables displayed were included in the multivariable logistic regression model for openness to use each non-cigarette tobacco product. OR and 95% CI are displayed.

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